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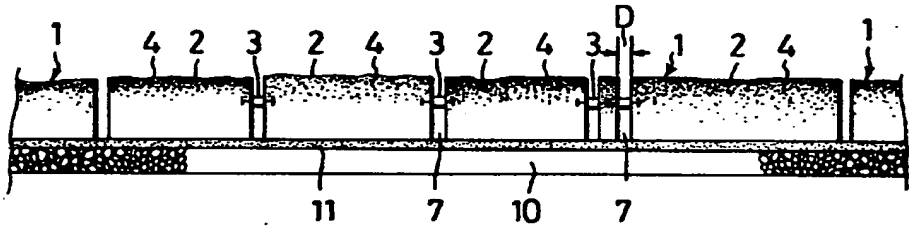
## (54) Connective paving block

(57) A connective paving block (1, 21) includes a plurality of block units (2, 22) formed of concrete. The block units are arranged with a prescribed gap (D, 7, 27) between adjacent block units and linked across the prescribed gap by a connecting member (3, 23) that provides flexibility between block units.

FIG.2

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## Description

The present invention relates to a connective paving block that is mainly for laying where it will not be subjected to a heavy load, such as, for example, a pedestrian sidewalk or other such walkway, riverside embankments, and sloping surfaces on prepared land.

A pedestrian sidewalk, to take one example, is conventionally paved by laying paving blocks one at a time, at a prescribed spacing, on a gravel or sand base, and then filling the joints with sand or other such material. Alternatively, the blocks are set in forms that are laid side by side.

Laying blocks one at a time is an extremely time-consuming task, as it involves adjusting the gap between adjacent blocks while at the same time ensuring that the blocks are level. This requires considerable skill, so such work has to be done by people having such skill, who are referred to as block layers. In addition, the laying process involves many steps per unit area, which makes it a lengthy and costly procedure.

Moreover, with a conventional laying process in which the individual blocks are separately laid one at a time on an adjustment layer of sand, each block can shift independently. Over time this can result in blocks becoming separated and settling unevenly. Therefore, a surface thus paved is prone to become uneven. Another drawback is that of instability of blocks caused by voids forming between blocks and the underlying adjustment layer. Blocks in such an unstable condition often come out and end up missing, requiring frequent repair and maintenance operations by the authorities in charge of the area. Uneven blocks are a particular problem on sidewalks because of the pedestrian safety factor, and can also result in blocks being lost faster than they can be replaced.

The object of the present invention is to provide a connective paving block that is durable, easy to lay, and does not become uneven.

To attain the above object, the present invention provides a connective paving block, comprising a plurality of block units formed of concrete that are arranged with a prescribed gap between adjacent block units which are linked across the prescribed gap by a connecting member that provides flexibility between block units.

The above object is also provided by a connective paving block, comprising a plurality of block units formed of concrete that are arranged with a prescribed gap between adjacent block units which are linked across the prescribed gap by electric heating material that provides flexibility between adjacent block units, the electric heating material being embedded in series in the plurality of block units.

Since adjacent block units are linked by a connecting member, a large load that is imposed on one block unit will be distributed to the adjacent block unit by the connecting member, which reduces the bearing pressure on the base layer and, by limiting independent movement and separation of individual blocks, prevents the blocks from becoming uneven.

Using electric heating material to connect the block units together not only prevents the blocks from becoming uneven, but in addition facilitates the rapid laying of paving that can be used to melt snow and ice, which formerly has been a costly operation requiring considerable skill.

Embodiments of the invention will now be described with reference to the following drawings.

Figure 1 is a plan view of a first embodiment of the connective block according to this invention.

Figure 2 is a sectional view of the connective block of Figure 1.

Figure 3 is a perspective view of a connecting member used to link adjacent block units together according to the first embodiment of the invention.

Figure 4 is a plan view showing part of a form used to produce the connective blocks of the invention.

Figure 5 is a perspective view of a partition strip used with the form of Figure 4.

Figure 6 is a side view of a connecting member used to link adjacent block units together according to a second embodiment of the invention.

Figure 7 is a side view showing what happens in the case of the connective blocks according to the invention when a void opens up between block units and the adjustment layer.

Figure 8 is a side view showing what happens in the case of conventional paving blocks when a void opens up between paving blocks and the adjustment layer.

Figure 9 is a plan view of a connective block according to the second embodiment of the invention.

Figure 10 is a sectional view of a sidewalk paved with the connective block arrangement of Figure 9.

Figure 11 is a perspective view of a connecting member used to link adjacent block units according to a third embodiment of the invention.

Figure 12 is a perspective view of a partition strip of a form used to produce the connective blocks of the invention.

Figure 13 is a plan view of a connecting member used to link adjacent block units according to a fourth embodiment of the invention.

Figure 14 is a sectional view of the connective member of Figure 13.

A first embodiment of the connective paving block according to the present invention will now be described with reference to Figures 1 and 2.

A connective block 1 of the invention is comprised of a plurality of suitably shaped block units 2 linked together by connecting members 3.

To form the block units 2, a molding form 8 divided into required shapes by partition strips 5, as shown in Figure 4, is charged with sand mixed with cement and water, and, optionally, a binder, and the mixture is compacted to form the block units, which are immediately demolded. A colored layer 4 having an appropriate color and pattern is formed on the upper surface of the block

units 2. The colored layer 4 is formed by coating the inside of the form 8 beforehand with a liquid pigment, so that when the form is then charged with concrete, the pigment permeates into the particles of concrete forming the surface portion. The blocks in the form can be given a surface having the irregularity of real stone, obtained by taking a mold of real stone, or can be patterned in the manner of real stone. This, together with the surface coloring, can be used to give the block units 2 removed from the form a surface texture resembling that of natural stone.

A connective block 1 is formed by using connecting members 3, an example of which is shown in Figure 3, to join together a plurality of block units 2 while leaving a space D between adjacent block units, as shown in Figure 1 or Figure 2.

Block units 2 located around the periphery are given a substantially straight outer edge, so that the connective block 1 is essentially rectangular in shape. The rectangular form is divided up into the required shapes of the block units 2 by partition strips 5 which, as shown in Figure 5, are each provided at a prescribed position with a locating recess 6 to receive a connecting member 3. As the connecting members 3 are used to link together adjacent block units by spanning the space D between block units, the connecting members 3 intersect the partition strips 5. The internal dimensions of the molding form 8 are preferably set to ensure a finished size of about 900 mm by 600 mm, which is small and light enough to be manually carried. The partition strips 5 are located along the spaces D that form the joints 7 between block units 2. For a sidewalk, partition strips about 5 mm thick are used.

The bottom inside surface of the form divided into shapes by the partition strips 5 is coated with a composite liquid pigment to form the colored layer 4 on the surface of the block units 2, as described above.

The connecting members 3 are fitted into the recesses 6. The connecting member 3 is an elongated member provided with at least one set of flange-shaped expanded diameter retaining portions 9, one at or near each end thereof, to retain the connecting member 3 in position. To impart a suitable degree of flexibility between the block units 2, the connecting members 3 are formed of a flexible material such as vinyl, synthetic resin or rubber, or aluminum or other such metal. Although in the illustrated example each connecting member 3 is provided with one set of retaining portions 9, it may instead be provided with multiple sets, shaped as desired. Using sponge rubber to cover the portion of the block unit 2 in which the connecting member 3 is embedded enables the connecting member 3 to swing slightly relative to the block unit 2, ensuring that the connecting member 3 cannot be pulled out of a block unit 2 if the retaining portion 9 catches. Thus, the angle between a block unit 2 and a connecting member 3 can readily change, increasing the overall flexibility of the connective block 1.

Figure 6 shows another embodiment of the connecting member 3. In this embodiment, the connecting member 3 is comprised of thin-strand wire rope cut to a suitable length. By applying a force along the axis of the wire rope, an expanded diameter portion is formed near each end. These expanded diameter portions are used as the retaining portions 9. Since it is constituted of wire rope, this connecting member 3 has excellent flexibility. In addition, since the coefficient of thermal expansion of this connecting member 3 is substantially the same as that of concrete, it expands and contracts with the expansion and contraction of the concrete and does not easily separate from the concrete. Connecting members 3 thus formed from wire rope are, for example, formed from wire rope 4 mm in diameter cut to a length of about 90 mm, and have retaining portions 9 about 8 mm in diameter formed by subjecting the wire to a compressive force. The retaining effect can be enhanced by providing each end with a plurality of such expanded retaining portions. These connecting members 3 are easy and cheap to make, involving nothing more than the cutting and pressing of wire rope.

The form 8 is divided into the required shapes by means of the partition strips 5, the connecting members 3 are arranged in the recesses 6, and the cavities thus formed by the partition strips 5 are charged with the raw material used to form the blocks, such as a mixture of sand and cement, which is then compacted while the form 8 is shaken, to form the block units, which are then removed from the form 8. This process method makes it possible to quickly produce standardized, rectangular connective blocks 1 comprised of multiple block units 2 linked by connecting members 3. Also, a colored layer 4 has been formed on the surface of each of the block units 2 by the permeation of pigments. By adjusting the colorants, the hues of each block unit 2 can be changed, and shades added to create effects that make the block units 2 look more like natural stone. The permeation process is also more economical in terms of the amount of pigment used, as only the surface portion is colored.

An example of a sidewalk paved with the above connective blocks 1 of the invention will now be described, with reference to Figure 7.

First, pebbles or the like are laid to form a base course 10 (Figure 2) for the sidewalk. The base course 10 is then overlaid by an adjustment layer 11 that is level, about 30 mm thick and constituted by sand or small stones.

The connective blocks 1 of the invention are laid on the adjustment layer 11. The rectangular shape of the connective blocks 1 make them easy to lay. A connective block 1 measuring 900 mm long by 600 mm wide and 60 mm thick could weigh less than 70 kg, which is light enough to be handled by two workers without using a mechanical conveyance.

The paving of the sidewalk is completed by using sand to fill the spaces between the connective blocks 1 and the spaces D between the block units 2 that comprise each of the connective blocks 1. In some cases a

slope is used to separate a sidewalk from a vehicle lane, in which case a curved surface is used to form the transition from the slope to the level portion. The flexibility provided between the block units 2 allows the connective blocks 1 to follow the contours of this curved surface. Thus, the connective blocks 1 of this invention are not limited to the paving of flat surfaces but also facilitate the paving of curved surfaces. Moreover, in contrast to conventional paving blocks which are each laid independently and, therefore, are more prone to give rise to voids when used to pave such curved surfaces, the block units 2 of the connective blocks 1 are linked by connecting members 3, making them less prone to voids and more durable.

As described above, a sidewalk paved with the connective blocks 1 of this invention has a surface that looks like natural stone, in addition to which the connecting members 3 used to link adjacent block units 2 serves to distribute a settling load imposed on one block unit 2. This reduces the bearing pressure per unit area on the adjustment layer 11 and helps to suppress flowage of sand and other material of the adjustment layer 11, thus preventing voids from forming between block units 2 and the adjustment layer 11. The result is that a surface paved with the connective blocks 1 of this invention does not exhibit unevenness even after extended use, and is therefore highly durable, and safe and comfortable to walk on.

Even if rain or the like should wash away part of the adjustment layer 11 and create a void between a block unit 2 and the adjustment layer 11, such as void G shown in Figure 7, since the weight of a person stepping on the block unit 2 is also supported by adjacent block units 2 owing to the presence of the connecting members 3, there is no separate settling of just the one block unit, so the paved surface does not become uneven. Safety is therefore preserved, and as block units 2 cannot be dislodged, there is no risk of the blocks being lost.

This is in contrast to the situation when conventional paving blocks 12 are used, as shown in Figure 8. In this case, when rain or the like causes a void G to open between a block 12 and the adjustment layer, the weight of a person stepping on the block 12 causes the block 12 to settle into the void, which is dangerous. Moreover, the settling of a block 12 allows further flowage of the sand of the adjustment layer, leading to further voids, and the blocks 12 gradually become more dislodged and eventually are lost.

Laying paving using the conventional small, separate blocks involves the independent adjustment of each of the gaps between blocks. Paving using the connective blocks 1 eliminates the need for this time-consuming task and requires no special skill or training, and can therefore be executed by ordinary workers, enabling the work to be completed more quickly and at a lower cost.

As the paving blocks look like natural stone, they help to preserve the natural environment by obviating the need to quarry real stone and, by providing a near-natural environment, are in tune with the needs of the times.

The connective blocks 1 of this invention are water permeable. This means that rainwater can infiltrate via the prescribed space D between the block units 2, into the subsoil. This ensures that connective blocks 1 remain puddle-free and easy to walk on, even in the rain. Enabling the rainwater to flow into the subsoil also helps to preserve the natural environment by ensuring that trees and other vegetation in urban areas receive adequate water. The block units 2 themselves can also be made water permeable by suitable selection of the grain size of the sand, binder and other raw materials of the blocks.

The above embodiment was described with reference to applying the connective blocks 1 to a level sidewalk. However, the connective blocks 1 can also be used for other applications, such as riverside embankments and sloping surfaces on prepared land.

An embankment has curved, uneven surfaces as well as flat surfaces. The flexibility of the connecting members 3 enables the connective blocks 1 to be laid with the block units 2 closely following the contours by fitting each block unit 2 to the curves. As the connective blocks 1 are water permeable, applying them to a river embankment provides a near-natural environment and prevents run-off of earth and sand. Plants can be grown in the spaces D between block units 2, thereby contributing to the preservation and recovery of the natural environment. Thus, the connective blocks 1 of this invention have a wide range of application and a high practical value.

Figures 9 and 10 illustrate connective paving blocks according to a second embodiment of the invention. In this embodiment, the connective paving block is able to melt snow by being comprised of multiple block units flexibly linked by electric heating material.

As in the case of the first embodiment, in accordance with the invention each of the connective blocks 21 is comprised of a plurality of suitably shaped block units 22 arranged in a form with a prescribed space between adjacent block units 22. Embedded electric heating material 28 connects the block units 22 in series, and thus forms a connecting member 23 across the space between adjacent block units 22. While the electric heating material 28 is shown arranged in a back-and-forth configuration, a spiral or any other configuration may be used provided the blocks remain connected in series.

The electric heating material is for example an electric heating coil 28 with a waterproof covering, that is arranged to serially connect the block units 22 of the connective block 21. The electric heating material 28 may be any material that gives off heat when a current is passed therethrough, such as nichrome wire or sheathed wire, for example.

The end of the electric heating coil 28 can be left with the wires projecting out to enable the heating coil 28 to be connected to the heating coil 28 of another con-

nective block 21, or to a power supply. However, in order to facilitate connecting the heating coil to a power supply or the like, and to make the connection more waterproof and prevent electrical leakage, it is preferable to attach a waterproof connector to the end of the heating coil.

Adjacent block units 22 can be linked by just the electric heating coil 28 alone. However, it is preferable to use connecting members 23 to reinforce the linkage.

As shown in Figure 11, the connecting member 23 is rod-shaped and has a flange portion 29 at each end to retain the connecting member 23 in position. The connecting member 23 may be provided with a hole 31 running longitudinally through the center thereof through which the heating coil 28 can be passed. Passing the heating coil 28 through the hole 31 protects the heating coil 28 as it crosses the space between block units 22, and also protects against breakage caused by the coil being bent under a load, such as when the connective block 21 is being transported. As in the case of the first embodiment, to impart a suitable degree of flexibility between the block units 22, the connecting members 23 are formed of a flexible material such as vinyl, synthetic resin or rubber, or aluminum or another such metal. Although in the illustrated example each connecting member 23 is provided with one set of retaining portions 29, it may instead be provided with multiple sets, shaped as desired. Using sponge rubber to cover the portion of the block unit 22 in which the connecting member 23 is embedded enables the connecting member 23 to swing slightly relative to the block unit 22, ensuring that the connecting member 23 cannot be pulled out of a block unit 22 if the retaining portion 29 catches. Thus, the angle between a block unit 22 and a connecting member 23 can readily change, increasing the overall flexibility of the connective block 21.

Figures 13 and 14 show a connecting member according to another embodiment of the invention.

This connecting member 23 has an opening 32 that runs along the top, and a coil channel 33 in communication with the opening 32. The connecting member 23 is also provided with a plurality of spaced-apart, flange-shaped retaining portions 29. This connecting member 23, too, formed of a flexible material such as vinyl, synthetic resin or rubber, or aluminum or another such metal.

The block units 22 are formed in the same way as those of the other embodiment, by filling a form with sand mixed with cement and water, and, optionally, a binder, compacting the mixture, and removing the formed blocks from the molding form. A colored layer 24 having an appropriate color and pattern is formed on the upper surface of the block units 22. The colored layer 24 is formed by coating the inside of the molding form beforehand with a liquid pigment that permeates into the concrete with which the form is charged, thereby coloring the surface portion.

The blocks in the form can be given a surface having the same type of surface roughness as real stone, by making a mold of real stone, or can be patterned in the manner of real stone. This, together with the surface coloring, gives the block units 22 removed from the form a surface texture resembling that of natural stone.

The block units 22 are arranged with a prescribed space between blocks, to provide the connective block 21 with a mosaic effect. The connective block 21 is given an uneven outer edge that fits into the edge of an adjacent connective block 21, extending the mosaic pattern.

The molding form used to form each connective block 21 is divided up into the required mold shapes of the block units 22 by arranging partition strips 25 at prescribed positions. When connecting members are used to link adjacent block units 22, the partition strips 25 are each provided at a prescribed position with a locating recess 26 into which the connecting member 23 fits, as shown in Figure 12. When a connecting member is not used, the partition strips 5 are provided with a small groove for the electric heating coil 28. As the connecting members 23 are used to link together adjacent block units 22 across the space between the block units, the recesses 26 are formed across the partition strips 25, and this also applies to the groove used to accommodate a heating coil.

The internal dimensions of the molding form are preferably set to ensure a finished size of about 900 mm by 600 mm, which is small and light enough to be manually carried. The partition strips 25 are located along the spaces D that form the joints 27 between block units 22. The partition strips 25 are about 5 mm thick.

The bottom inside surface of the molding form divided into shapes by the partition strips 25 is coated with a composite liquid pigment to produce the above-described colored layer 24 on the surface of the block units 2.

When an electric heating coil 28 is used to link block units 22 without using a connecting member, the coil 28 is arranged in the groove formed for that purpose. When a connecting member 23 is used, the coil 28 is passed through the coil hole 31 beforehand and the connecting member 23 is then fitted into position in the molding form, or the coil 28 is fitted into the opening 32 of a connecting member 23 in place in the molding form, or the connecting member 23 is placed into position in the molding form and the coil 28 is arranged separately from the connecting member 23. After that has been done, as in the preceding embodiment the block molding cavities are charged with a mixture of sand and cement, which is then compacted while the form is being shaken to form the block units, which are then removed from the form.

This process method makes it possible to quickly produce standardized, rectangular connective blocks 21 comprised of multiple block units 22 linked by connecting members 23 and/or an electric heating coil 28.

Also, a colored layer 24 has been formed on the surface of each of the block units 22 by the permeation of pigments. By adjusting the pigments, the hues of

each block unit 22 can be varied and shades added to create effects that make the block units 22 look even more like natural stone. This pigment permeation process is also more economical in terms of the amount of pigment used, as only the surface portion is colored.

In this embodiment the outside edge of the connective block 21 is shaped for interlocking with an adjacent connective block 21. However, it is to be understood that the connective block 21 is not limited to this shape, and may instead have a substantially rectangular shape formed by outside straight edges of block units 22 located around the periphery, or have one or two straight sides. Connective blocks thus formed with one or two straight sides are suitable for sidewalk edges and corners.

The process of paving a sidewalk with the connective blocks 21 thus formed will now be described, with reference to Figure 10.

A layer of concrete about 100 mm thick is poured to form a roadbed 30, on which a plurality of connective blocks 21 are laid, each separated from the next by a prescribed space. These connective blocks 21 are fixed in place by the cast-in-place concrete of the roadbed 30. The end of the electric heating coil 28 is connected to an electric power supply, or to the end of the heating coil 28 of an adjacent connective block 21, to enable the electric heating coil 28 to be supplied with electricity.

A plurality of power supply housings are arranged at prescribed intervals along the sidewalk. These power supply housings are connected to the electric heating coils 28 in the connective blocks 21 by underground cable.

The connective blocks 21 are shaped to allow them to interlock into a mosaic, so the laying operation is a simple matter of placing and aligning them in a row. Each connective block 21 measures about 900 mm long by 600 mm wide and 60 mm thick and weighs less than 70 kg, and can therefore be handled by two workers without using a mechanical conveyance.

Once the connective blocks 21 have been fixed in place on the roadbed 30, the heated sidewalk paving is completed by filling the spaces between the connective blocks 21 and the spaces constituting the joints 27 between the constituent block units 22. When a slope is used to separate a sidewalk from a vehicle lane, the transition from the slope to the level portion is curved. The flexibility provided between the block units 22 allow the connective blocks 21 to be shaped to the contours of this curvature. Thus, the connective blocks 21 of this invention are not limited to the paving of flat surfaces but also facilitate the execution of heated paving of curved surfaces.

The present invention is not limited to the embodiments described in the foregoing. Numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein. For example, block units may be used all having the same shape, rather than the different shapes described in the foregoing.

As described in the foregoing, the present invention comprises a plurality of block units formed of concrete that are arranged with a prescribed gap between adjacent block units which are linked across the prescribed gap by a connecting member that provides flexibility between the block units, which enables the blocks to be laid quickly without requiring specialized skills. The ability to be executed by ordinary workers enables the paving to be completed more quickly and reduces the cost.

As the block units are linked, they stay together and do not exhibit unevenness even after extended use. A paving formed of such block units provides good durability, and as the block units are linked, there is no risk of individual blocks becoming dislodged and lost.

Furthermore, the surface coloration of the block units enhances the appearance of the paved surface, and because the coloration permeates down through the surface region, the coloring is not erased by surface wear. Even if the pigments used for the coloring are expensive, that fact that only the surface portion is colored makes it more economical.

Also, the fact that the connecting members are themselves formed of flexible material facilitates laying the connective blocks on curved surfaces, and ensures that they stay in contact with the underlayer. A retaining portion of the connecting members is set into the block units, which ensures that the connecting members cannot easily be pulled out.

By using electric heating material to connect the block units together, sidewalks can be provided with heated paving without special skill or expertise, and the work can be done quickly and at a lower cost than was possible before.

## Claims

1. A connective paving block (1, 21), comprising a plurality of block units (2, 22) formed of concrete that are arranged with a prescribed gap (D) between adjacent block units which are linked across the prescribed gap by a connecting member (3, 23) that provides flexibility between block units.

2. A connective paving block according to claim 1, wherein a permeated surface colored layer (4, 24) is formed on the block units (2, 22).

3. A connective paving block according to claim 1 or 2, wherein the connecting member (3, 23) is formed of flexible material and a part of the connecting member embedded in a block unit (2, 22) has a portion (9, 29) that retains the connecting member in the block unit.

4. A connective paving block according to claim 3, wherein the connecting member (3, 23) is a length

of wire rope (3) having an expanded diameter portion (9) at each end.

5. A connective paving block according to claim 1 or 2, wherein the connecting member (3, 23) is formed of electric heating material (28) that links and is embedded in the block units.

6. A connective paving block according to any of claims 1 to 3, wherein the connecting member (3, 23) has a hollow portion (33) through which the electric heating material (28) crosses the gap (D) between adjacent block units (2, 22).

7. A connective paving block, comprising a plurality of block units (2, 22) formed of concrete that are arranged with a prescribed gap (D) between adjacent block units which are linked across the prescribed gap by electric heating material (28) that provides flexibility between adjacent block units, the electric heating material being embedded in series in the plurality of block units.

8. A connective paving block according to claim 7, wherein a permeated surface colored layer (4, 24) is formed on the block units.

9. A connective paving block according to claim 7, wherein a connecting member (3, 23) through which the electric heating material (28) has been passed is arranged across the gap (D) between adjacent block units (2, 22), linking the adjacent block units and providing flexibility between the block units.

10. A connective paving block according to claim 9, wherein the connecting member (3, 23) is formed of flexible material and a part of the connecting member embedded in a block unit has a portion (9, 29) that retains the connecting member in the block unit.

11. A connective paving block according to claim 8 or 9, wherein the connecting member (3, 23) has a hollow portion (33) through which electric heating material (28) crosses the gap (D) between adjacent block units.

FIG.1

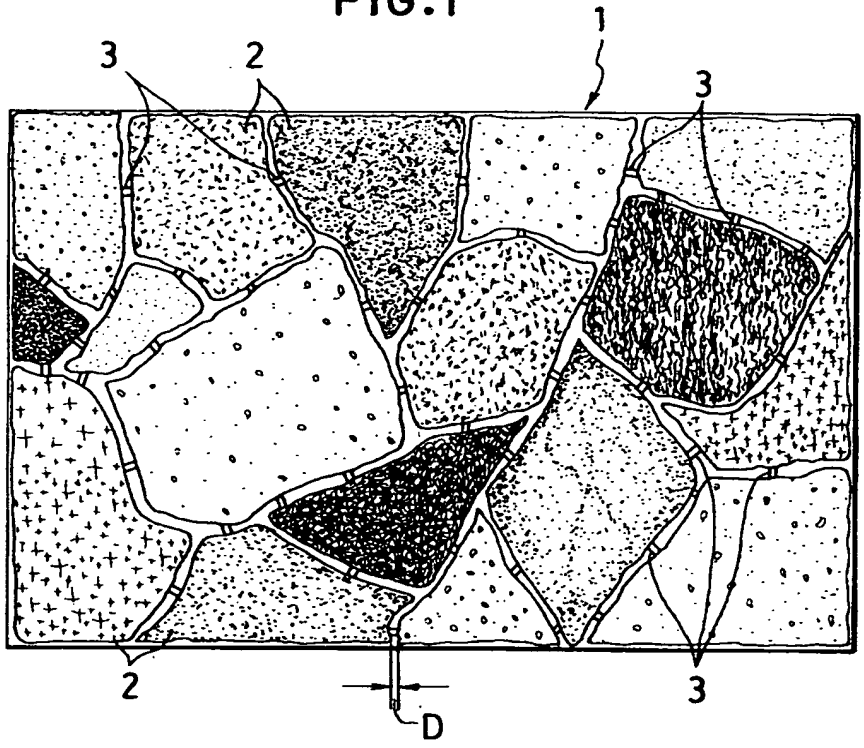


FIG.2

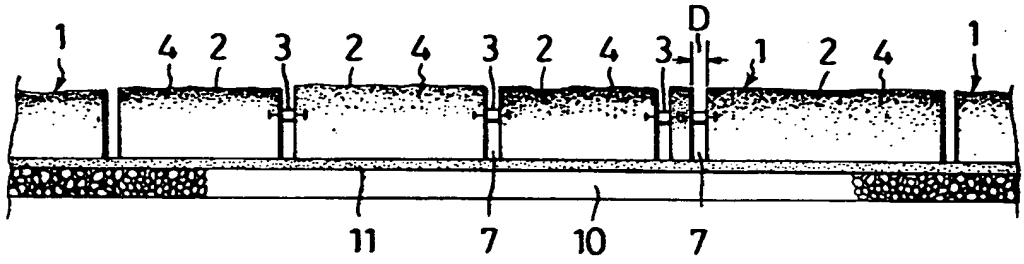

FIG.3

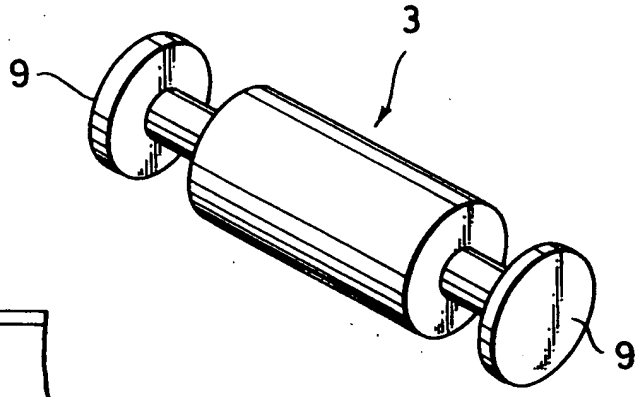


FIG.4

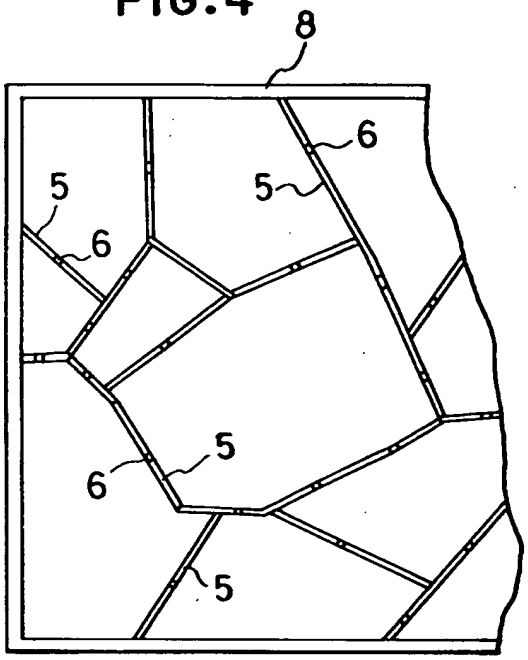


FIG.5

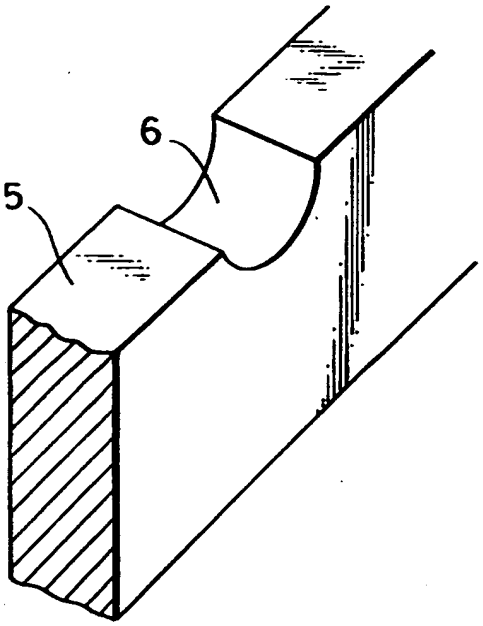

FIG.6

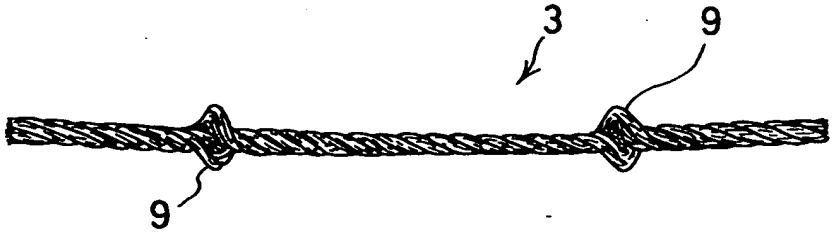


FIG.7

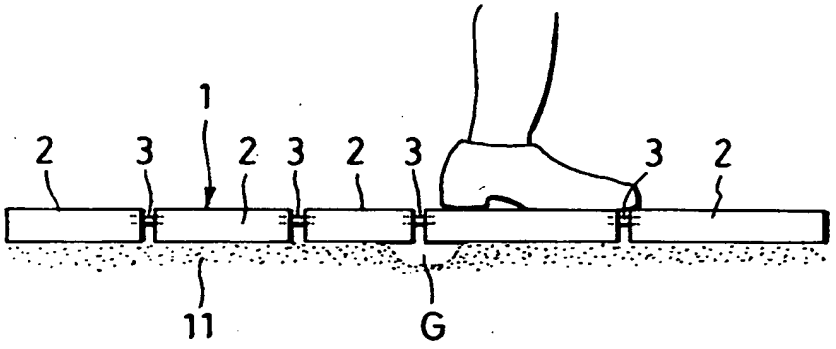


FIG.8

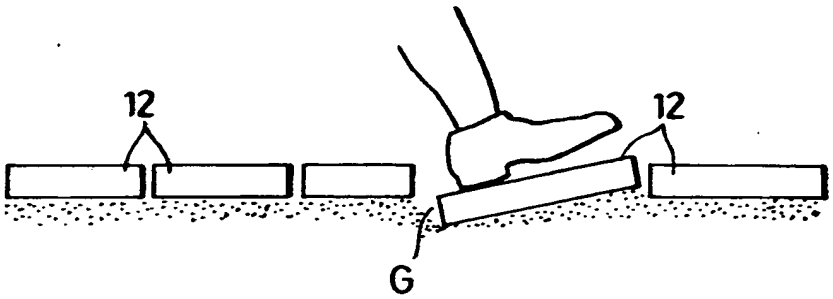

FIG.9

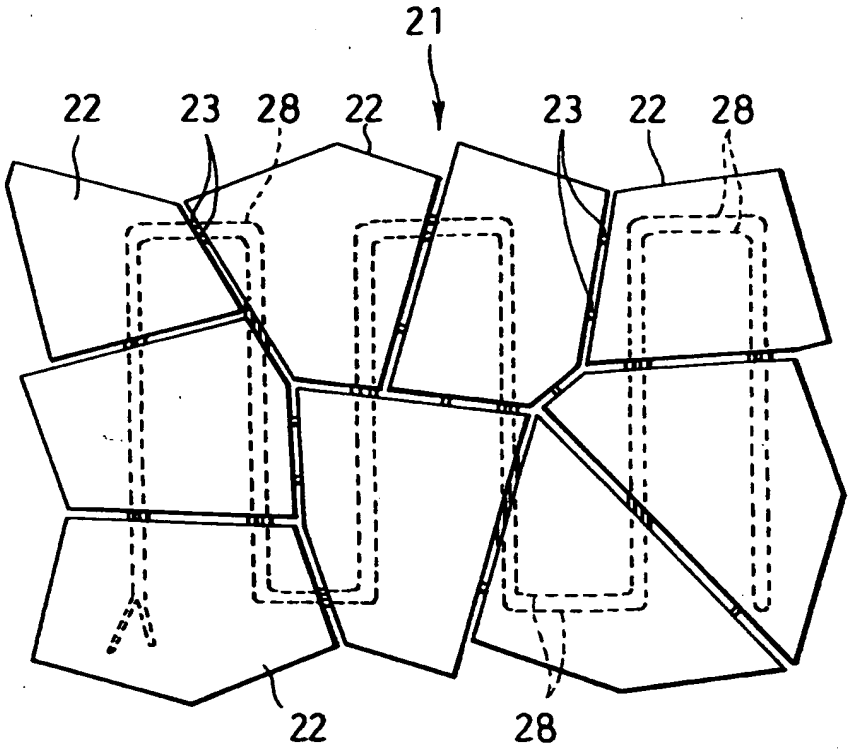
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FIG.10

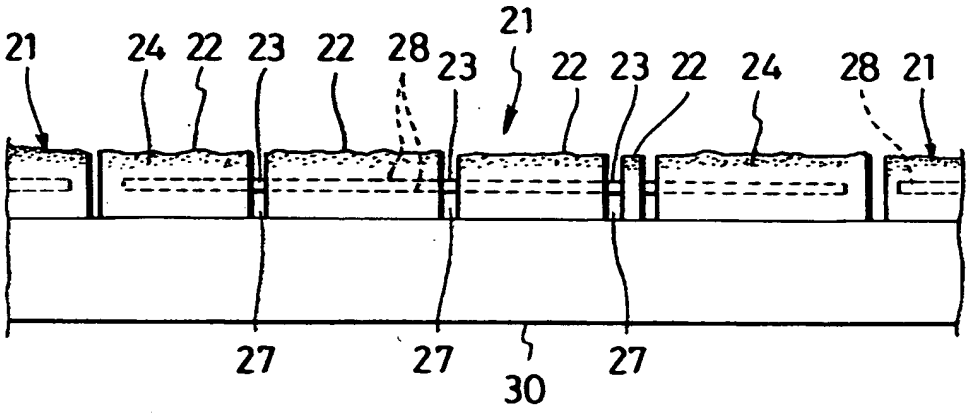
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FIG.11

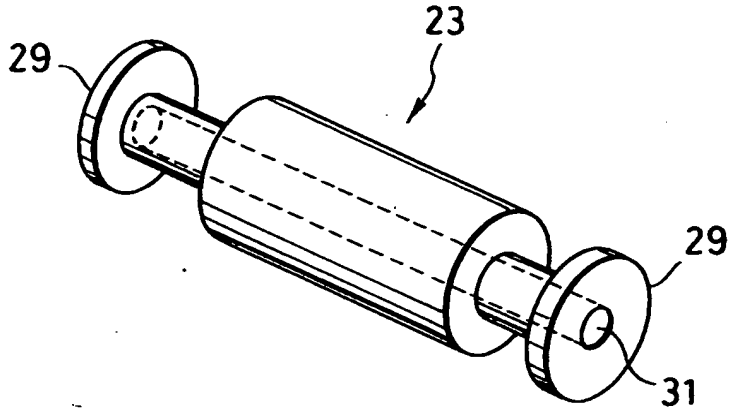



FIG.12

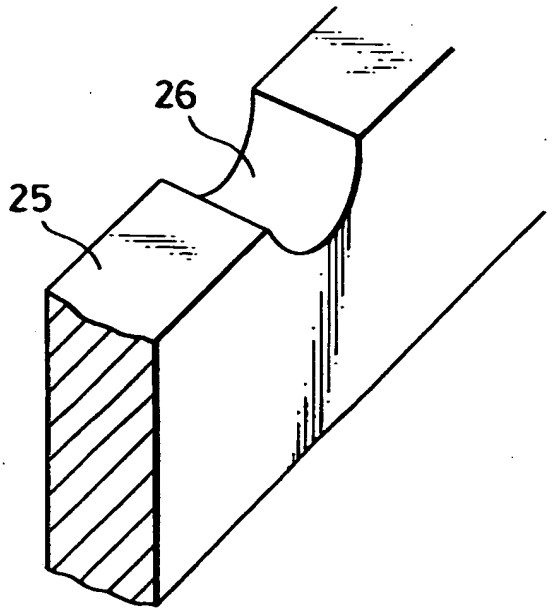


FIG.13

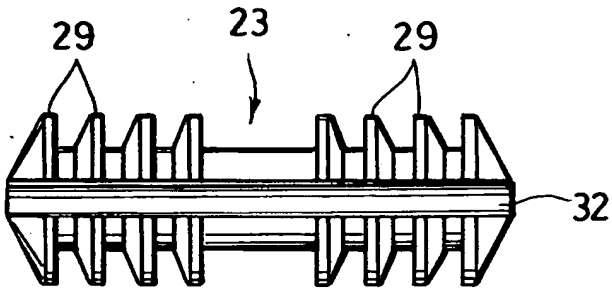
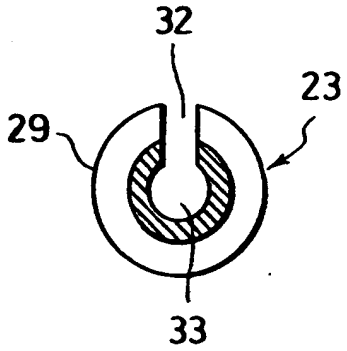



FIG.14



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# EUROPEAN SEARCH REPORT

Application Number
EP 95 30 7742

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
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| Y | CN-A-1 059 327 (UNKNOWN) 11 March 1992<br>* abstract * | 2,8 | |
| Y<br>A | FR-A-2 610 955 (LECLOUX ROBERT ;PESTOURIE ALAIN (FR)) 19 August 1988<br>* abstract *<br>* page 6, line 35 - line 37; figures * | 4,5,7<br>1,3,6,9 | |
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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 6 May 1996 | Dijkstra, G |

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